Implementing the Climate Smart Sanctuaries Initiative (and beyond) at Gulf of the Farallones National Marine Sanctuary

Kelley Higgason
GFNMS Ocean Climate Initiative and Advisory Council Coordinator

OCNMS Advisory Council Meeting

September 17, 2010

NATIONAL MARINE SANCTUARIES

ONMS CLIMATE CHANGE COORDINATION

Climate Smart Sanctuaries

- ✓ Condition report; site scenario (climate story); adaptation training; action plan (research & monitoring, education & outreach, adaptive management at minimum)
- ✓ Site achieves minimal green operating standards
- ✓ Local review team assesses, provides recommendation to ONMS Executive Team for ultimate decision

ONMS Climate Subcommittee

- ✓ Coordinate climate efforts into cohesive national program; help develop Climate Smart Sanctuaries standards
- ✓ Maximize ability to prepare for and protect resources
- ✓ ONMS as part of the larger climate effort within and outside of NOAA

GFNMS OCEAN CLIMATE INITIATIVE

Ocean Climate Initiative Activities

Climate Change Adaptation Training

Climate Change Impacts Report

Ocean Climate Summits

Climate Change Action Plan

Ocean Climate Center

West Coast Ocean Acidification Task Force

Bay Area Ecosystems Climate Change Consortium

Progress Toward Climate Smart Status

✓ Minimum green standards (Aug 09)

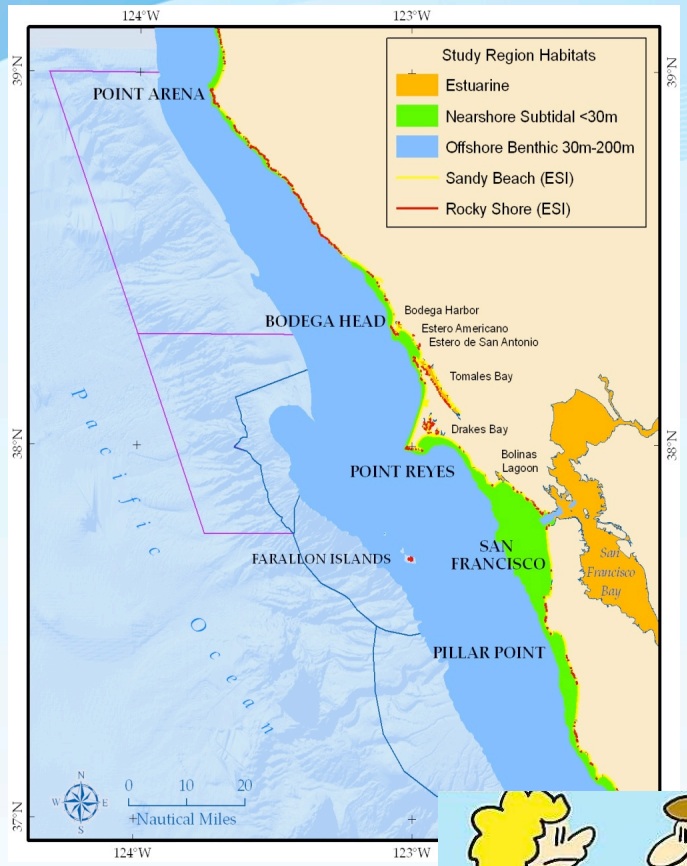
✓ Adaptation Training (Nov 09, Feb 10)

✓ Climate Change Impacts Report (June 10)

✓ Condition Report (June 10)

Climate Change Action Plan (in progress)

GF/CB CLIMATE CHANGE IMPACTS REPORT



"I hear a tiny voice complaining about global warming."

Goal

Best available knowledge on observed and predicted physical and biological climate change impacts to the north-central CA coast through local scientific consensus

Outcome

Foundation to guide development and prioritization of research and monitoring activities, and inform future outreach and management actions

GF/CB CLIMATE CHANGE IMPACTS REPORT WORKING GROUP

Sarah Allen, Point Reyes National Seashore
Bob Breen, Gulf of the Farallones National Marine Sanctuary Advisory Council
Jenifer Dugan, Marine Science Institute, University of California, Santa Barbara
Brian Gaylord, University of California, Davis; Bodega Marine Lab
Edwin Grosholz, University of California, Davis; Bodega Marine Lab
Daphne Hatch, Golden Gate National Recreation Area
Tessa Hill, University of California, Davis; Bodega Marine Lab
Jaime Jahncke, PRBO Conservation Science; CBNMS Advisory Council
Judith Kildow, Ocean Economics Program
Raphael Kudela, University of California, Santa Cruz
John Largier (Chair), UC Davis; Bodega Marine Lab; GFNMS Advisory Council
Lance Morgan, Marine Conservation Biology Institute; CBNMS Advisory Council
David Revell, Philip Williams and Associates
David Reynolds, National Weather Service
Frank Schwing, National Marine Fisheries Service
William Sydeman, Farallon Institute
John Takekawa, United States Geological Survey

GF/CB CLIMATE CHANGE IMPACTS REPORT WORKING GROUP

Extensive Collaboration

17 WG members, 36 contributors from 16 agencies, organizations and institutions; 2 WG staff, 2 superintendents

Logistics

1.5 year process, final released June 2010

4 in-person meetings

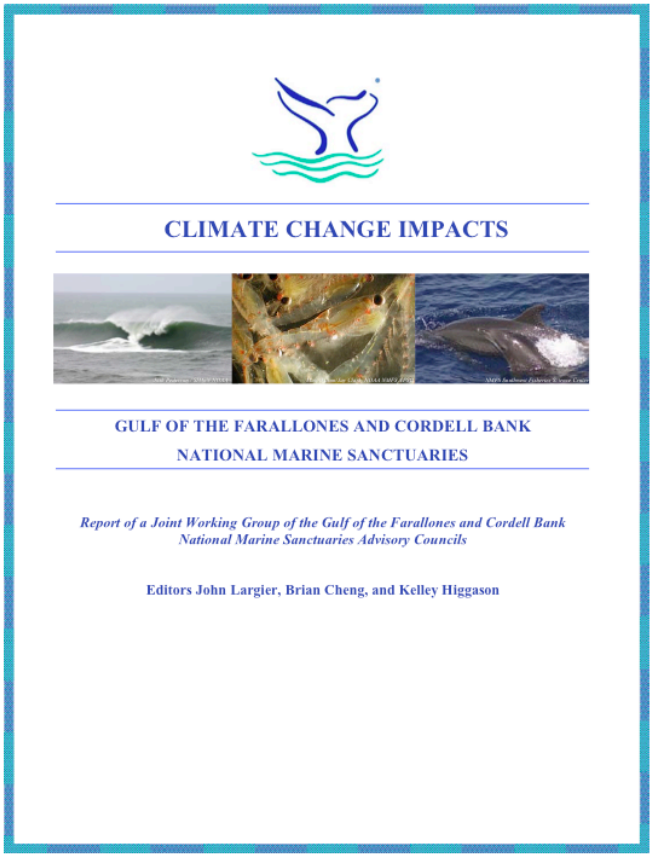
3 editors (chair, coordinator, manager)

Working group and other contributors authored and/or reviewed sections

Funding

Stipend for part time project coordinator from ONMS (through summer 09)

Project manager funded through GFNMS base funds



DRAFT ONMS SITE SCENARIO TEMPLATE

I. Main Climate Change Impact Drivers

- Sea Level Rise
- Variability in Weather Patterns
- Ocean Circulation
- Ocean Acidification

II. Interaction of Drivers with Other Stressors

III. Potential Changes, Impacts and Vulnerabilities

- Ecosystem Resilience
- Maritime Heritage/Cultural Resources
- Community Adaptation and Natural Hazards

IV. Potential Changes/Impacts to Society & Economic Sectors

CLIMATE CHANGE IMPACTS REPORT

Valuable to natural resource managers and educators as a "primer" for climate change impacts to north-central CA coast

Key Issues

- ⇒ Observed increase in sea level (100 year record at mouth of San Francisco Bay)
- ⇒ Expected increase in coastal erosion associated with changes in sea level and storm waves
- ⇒ Observed decrease in spring runoff of freshwater through San Francisco Bay, due to decreased snowpack
- ⇒ Observed increase in precipitation variability (drier dry years, wetter wet years)
- ⇒ Observed increase in surface ocean temperature offshore (50 year record)
- ⇒ Observed increase in winds driving the upwelling of cold, nutrient-rich waters (30 year record at offshore buoys)
- ⇒ Observed increase in extreme weather events (winds, waves, storms)
- ⇒ Expected decrease in pH, due to uptake of CO_2 by the ocean
- ⇒ Observed northward shift of key species (including Humboldt squid, volcano barnacle, gray whales, bottlenose dolphins)
- ⇒ Possible shift in dominant phytoplankton (from diatom to dinoflagellate blooms)
- ⇒ Potential for effects of climate change to be compounded by parallel environmental changes associated with local human activities

Recommendations

- ⇒ ***Educate society*** – *inform people to allow for optimum decisions*
- ⇒ ***Put ecosystems in context*** – *link greenhouse gas emissions with marine ecosystem health*
- ⇒ ***Anticipate change*** – *obtain best available information on changing and future conditions*
- ⇒ ***Mitigate impacts on the system*** – *reduce manageable stressors that compromise system resiliency*
- ⇒ ***Adapt to change*** – *create policies and management strategies that are flexible to future changes*

http://farallones.noaa.gov/

CLIMATE CHANGE IMPACTS REPORT

Lessons **Learned**

- Time intensive and therefore need to be realistic about staff costs
- Diverse and local contributors key to success
- Hard for scientists to speculate, yet not a lot of local scale info
- Socioeconomic portion as a separate document
- Chair of working group important: move diverse group forward; well respected in science community
- All encompassing focus requires more time; may consider focusing on prioritized major threats

OCEAN CLIMATE SUMMITS

April 2008

Panels on latest science, policy, and challenges to communicating climate change; afternoon breakout groups

Partners: Cal Academy of Sciences, 11th Hour Project

June 2010

Breakout groups to help frame strategies for Climate Change Action Plan: Public Outreach; Science and Information; Adaptation and Innovation

Share successes/challenges, promote collaborations amongst local educators, managers, scientists

Summit Report with next steps highlighted

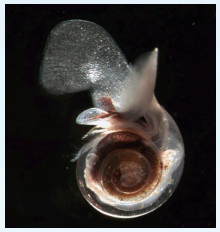
Partners: Cal Academy, SF Bay NERR Coastal Training Program, 11th Hour Project, ONMS

http://farallones.noaa.gov/eco/climate/summits.html

OCEAN CLIMATE INITIATIVE ACTION PLAN

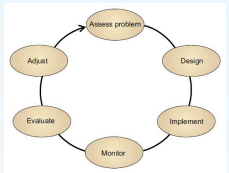
✓**Green Operations: Reducing Our Carbon Footprint**

Working group developed over 130 strategies*:*
http://farallones.noaa.gov/about/facilities.html



Research and Monitoring

Est. working group of local scientists: identify gaps, develop strategies, identify leads/partnerships to implement



Adaptive Management and Policy

Est. Technical Advisory Committee: identify local planning obstacles, develop strategies and collaborative outcomes

Education and Outreach

Internal staff team and partner review: exhibits, school programs, seminars

OCEAN CLIMATE CENTER

Ribbon-cutting for Building October 2010

Announce DOI/NOS Letter of Agreement for Bay Area offices to work collaboratively on climate change

Focus

Facilitate implementation of Action Plan strategies

Promote partnerships to address climate change in the Bay Area marine environment

Communicate local coast and ocean climate change issues and pathways toward solutions; serve as a regional hub

THANK YOU!

FOR MORE INFORMATION VISIT
http://farallones.noaa.gov/eco/climate/climate.html

Climate and its influence on evolution.
A theory.